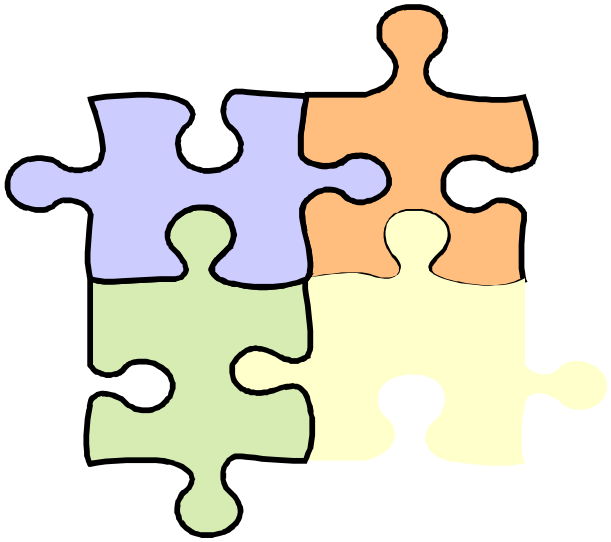
Field Review of Proposed Single Subject Subject-Matter Program Standards In Science



Survey

August 2002

Please print a copy of the survey and complete and mail or fax your response by **September 23, 2002** to:

The California Commission on Teacher Credentialing
1900 Capitol Avenue
Sacramento, California 95814
fax 916 324-8927

Introduction

Your response to this survey will inform the California Commission on Teacher Credentialing's field review of proposed new standards of program quality and effectiveness for Single Subject Subject-Matter Programs. These programs for prospective teachers offer one pathway to demonstrate competency in a subject area. In addition to subject matter competency, prospective single subject teachers must also complete an approved program of pedagogical preparation that focuses on the knowledge, skills and abilities associated with a departmentalized teaching assignment.

Individuals holding a Single Subject Teaching Credential may teach in a specific subject area in departmentalized classes in grades K-12. Departmentalized classes are those in which a teacher teaches one subject to a class of students and are typically offered in high schools and middle or junior high schools.

It is the responsibility of the Commission to ensure that each prospective teacher experiences a high quality preparation program. The Commission does this by adopting standards of program quality and effectiveness that assure consistency across all approved programs in all subject areas. This set of draft standards for single subject programs is divided into two sections, Standards Common to All and Standards for Programs in Science.

The Draft Standards Common to All address program qualities that are consistent across all subject areas. The proposed standards are:
Draft Standard 1: Program Philosophy
Draft Standard 2: Technology
Draft Standard 3: Diversity and Equity
Draft Standard 4: Coordination
Draft Standard 5: Advisement and Support
Draft Standard 6: Assessment of Subject Matter Competence
Draft Standard 7: Program Review and Evaluation
Draft Standard 8: Literacy
Draft Standard 9: Early Field Experiences
Draft Standard 10: Varied Teaching Strategies

The Draft Standards Common for Programs in Science are:
Draft Standard 11: The Vision for Science
Draft Standard 12: General Academic Quality

Draft Standard 13: Integrated Study of Science
Draft Standard 14: Breadth of Study
Draft Standard 15: Depth of Study in a Concentration Area
Draft Standard 15A: Biological Sciences Concentration
Draft Standard 15B: Chemistry Concentration
Draft Standard 15C: Geosciences (Earth and Planetary Sciences) Concentration
Draft Standard 15D: Physics Concentration
Draft Standard 16: Laboratory and Field Experience
Draft Standard 17: Safety Procedures

Each standard includes the standard statement and required elements. The required elements provide further description and explanation of the concepts addressed in the standard statement. Program sponsors will be expected to address the standard as a whole and each required element.

General Directions

The survey questions are designed to find out how important you and other educators think the proposed standards and their required elements are in the preparation of effective single subject teachers. Survey results will be used to revise the draft standards and develop a final set of standards for recommendation to the Commission for adoption. Once adopted, each prospective program sponsor in a single subject area will be required to prepare a written response to the new standards.

You will be asked to rate the importance of each program standard statement and each required element in relation to the effective preparation of prospective teachers. You will also be asked whether any program elements are missing and will be provided space to suggest additional elements or topics to be addressed in the standard. Finally you will be asked whether this draft set of subject area program standards considered as a whole address all the elements necessary for a program to prepare effective teachers of Science.

Please answer the survey questions based on your own experiences.

Background Information

1. Are you currently working in a K-12 or an IHE organization? Yes O GO to Question 2 No O STOP! You do not have to answer any more questions. Please discard this survey.	**2**.Are you currently, or have your recently (last 3-5 years) been working with the area of science? Yes O GO to Question 3 No O STOP! You do not have to answer any more questions. Please discard this survey.	**3**. Are you familiar with the K-12 student academic content standards in science? Yes O GO to Question 4 No O STOP! You do not have to answer any more questions. Please discard this survey.
4. Name:	5. Position:	6: May we contact you for further information? Telephone: (_ _ _)-_ _ _-_ _ _ _ Fax: (_ _ _)-_ _ _-_ _ _ _ Email: _____

Draft Standards Common to All

Standard 1:	Program Philosophy and Purpose
Standard 2:	Technology
Standard 3:	Diversity and Equity
Standard 4:	Coordination
Standard 5:	Advisement and Support
Standard 6:	Assessment of Subject Matter Competence
Standard 7:	Program Review and Evaluation
Standard 8:	Literacy
Standard 9:	Early Field Experiences
Standard 10:	Varied Teaching Strategies

Standards Common to All

	1.0 How important are these program characteristics in preparing effective teachers of science?			
Draft Standard 1: Program Philosophy and Purpose	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The subject matter preparation program is based on an explicit statement of program philosophy that expresses its purpose, design, and desired outcomes reflective of the Standards for Single Subject Teaching Credential Programs. The program provides the course work and field experiences necessary to teach the specified subject to all students in California's diverse public school population. The subject matter preparation for prospective teachers is academically rigorous and intellectually stimulating. The institution assigns high priority to and appropriately supports the program as an essential part of its mission. The program curriculum reflects and builds on the State-adopted *Academic Content Standards for K-12 Students* and *Curriculum Frameworks for California Public Schools.* The program is designed to establish a strong foundation in subject matter knowledge and understanding that provides a basis for continued development during the teachers' professional career.	O	O	O	O
1.1 The program philosophy, design, and intended outcomes are consistent with the content of the State-adopted Academic Content Standards for K-12 students and Curriculum Frameworks for California public schools.	O	O	O	O
1.2 The statement of program philosophy shows a clear understanding of the preparation that prospective teachers need in order to be effective in delivering academic content to all students in California schools.	O	O	O	O

Draft Standard 1: Program Philosophy and Purpose	Essential	Important	Somewhat Important	Not Important
1.3 The program provides prospective teachers with the opportunity to learn and apply significant ideas, structures, methods and core information in the specified subject discipline(s) that underlies the 6-12 curriculum.	O	O	O	O
1.4 The program prepares prospective single-subject teachers to analyze complex discipline-based issues; synthesize information from multiple sources and perspectives; communicate skillfully in oral and written forms; and use appropriate technologies.	O	O	O	O
1.5 Program outcomes are defined clearly and assessments of prospective teachers and program reviews are appropriately aligned.	O	O	O	O
1.6 The institution conducts periodic review of the program philosophy, goals, design, and outcomes consistent with the following: campus program assessment timelines, procedures, and policies; ongoing research and thinking in the discipline; nationally accepted content standards and recommendations; and, the changing needs of public schools in California.	O	O	O	O
1.7 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, what would you add?				

Standards Common to All

	2.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 2: Technology	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The study and application of current and emerging technologies, with a focus on those used in K-12 schools, for gathering, analyzing, managing, processing, and presenting information is an integral component of the each prospective teacher's program of study. Prospective teachers are introduced to legal, ethical, and social issues related to technology. The program prepares prospective teachers to meet the current technology requirements for admission to an approved California professional teacher preparation program.	O	O	O	O
2.1 The institution provides prospective teachers in the subject matter program access to a wide array of current technology resources. The program faculty selects these technologies on the basis of their effective and appropriate uses in the disciplines of the subject matter program.	O	O	O	O
2.2 Prospective teachers demonstrate information processing competency, including but not limited to the use of appropriate technologies and tools for research, problem solving, data acquisition and analysis, communications, and presentation.	O	O	O	O
2.3 In the program, prospective teachers use current and emerging technologies relevant to their discipline to enhance their subject matter knowledge and understanding.	O	O	O	O
2.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, which would you add?				

Standards Common to All

	3.0 How importamt are these program characteristics for preparing effective teachers of science?			
Draft Standard 3: Diversity and Equity	**Essential**	**Importamt**	**Somewhat Important**	**Not Important**
The subject matter program provides equitable opportunities to learn for all prospective teachers by utilizing instructional, advisement and curricular practices that insure equal access to program academic content and knowledge of career options. Included in the program are the essential understandings, knowledge and appreciation of the perspectives and contributions by and about diverse groups in the discipline.	O	O	O	O
3.1 The institution recruits and provides information and advise to men and women prospective teachers from diverse backgrounds on requirements for admission to and completion of subject matter program.	O	O	O	O
3.2 In the subject matter program, prospective teachers examine principles of educational equity and diversity and their implementation in the curriculum and instructional practices in California public schools.	O	O	O	O
3.3 In the subject matter program, classroom practices and instructional materials are designed to provide equitable access to the academic content of the program to prospective teachers from all background.	O	O	O	O
3.4 The subject matter program incorporates a wide variety of pedagogies and opportunities that take into account cognition and the different ways that students learn. Instructional practices and materials used in the program support equitable access for all prospective teachers and take into account current knowledge of cognition and human learning theory.	O	O	O	O
3.5 Fieldwork experiences for all prospective teachers include significant interactions with K-12 students from diverse populations represented in California public schools.	O	O	O	O

Standards Common to All

3.6. Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, what would you add?

Standards Common to All

	4.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 4: Coordination	**Essential**	**Important**	**Somewhat Important**	**Not Important**
One or more faculty responsible for program planning, implementation and review coordinate the Single Subject Subject Matter Preparation Program. The program sponsor allocates resources to support effective coordination and implementation of the program. The coordinator(s) ensure ongoing collaboration among academic program faculty, local school personnel, local community colleges and the professional education faculty.	O	O	O	O
4.1 A program coordinator will be designated from within the academic program faculty.	O	O	O	O
4.2 The program coordinator will ensure that opportunities are provided for collaboration by faculty, students, and appropriate public school personnel in the design, development of and revisions to the program and communicate program goals to the campus community, other academic partners, school districts and the public.	O	O	O	O
4.3 Sufficient time and resources are allocated for faculty coordination and staff support for all aspects of the program.	O	O	O	O
4.4 The program provides opportunities for collaboration on curriculum development among program faculty.	O	O	O	O
4.5 University and program faculty will cooperate with community colleges to coordinate courses and articulate course requirements for prospective teachers anticipating transfers to a baccalaureate degree-granting institution.	O	O	O	O

Standards Common to All

4.6 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, what would you add?

Standards Common to All

	5.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 5: Advisement and Support	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The subject matter program includes a system for identifying, advising and retaining prospective Single Subject teachers. This system will comprehensively address the distinct needs and interests of: • Resident prospective students • Early deciders entering blended programs • Underrepresented groups among present teachers • Prospective teachers who transfer to the institution • Prospective teachers in career transition	O	O	O	O
5.1 The institution will develop and implement processes to identify prospective Single Subject teachers and advise them about all program requirements, and career options.	O	O	O	O
5.2 Advisement services will provide prospective teachers with information about their academic progress, including transfer agreements and alternative paths to a teaching credential, and describe the specific qualifications needed for each type of credential, including the teaching assignments it authorizes.	O	O	O	O
5.3 The subject matter program facilitates the transfer of prospective teachers between post-secondary institutions including community colleges through effective outreach and advising and the articulation of courses and requirements. The program sponsor works cooperatively with community colleges to ensure that subject matter coursework at feeder campuses is aligned with the relevant portions of the State-adopted *Academic Content Standards for K-12 Students in California Public Schools*.	O	O	O	O
5.4 The institution establishes clear and reasonable criteria and allocates sufficient time and personnel resources to enable qualified personnel to evaluate prospective teachers' previous coursework and/or fieldwork for meeting subject matter requirements.				

Standards Common to All

5.5 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, what would you add?

Standards Common to All

	6.0 How necessary are these program characteristics for preparing effective teachers of science?			
Draft Standard 6: Assessment of Subject Matter Competence	**Critical**	**Necessary**	**Somewhat Necessary**	**Not Necessary**
The program uses multiple formative and summative measures to assess the subject matter competence of each candidate. The scope and content of each candidate's assessment is consistent with the content of the subject matter requirements of the program.	O	O	O	O
6.1 Assessment within the program includes multiple measures such as student performances, presentations, research projects, portfolios, field experience journals, observations, and interviews as well as oral and written examinations based on criteria established by the institution.	O	O	O	O
6.2 The scope and content of each assessment is congruent with the specifications for the subject matter knowledge and competence as indicated in the content domains.	O	O	O	O
6.3 End-of-program summative assessment includes a defined process for evaluating performance, an appeal process, and specific opportunities for candidates to repeat portions of the assessment as needed.	O	O	O	O
6.4 Assessment scope, process, and criteria are clearly delineated and made available to students when they begin the program.	O	O	O	O
6.5 The program staff regularly evaluates the quality, fairness, and effectiveness of the assessment process, including its consistency with program requirements.	O	O	O	O
6.6 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, what would you add?				

Standards Common to All

	7.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 7: Program Review and Evaluation	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The institution implements a comprehensive, ongoing system for periodic review of and improvement to the subject matter program. The ongoing system of review and improvement involves university faculty, community college faculty, student candidates and appropriate public school personnel involved in beginning teacher preparation and induction. Periodic reviews shall be conducted at intervals not exceeding 3 years.	O	O	O	O
7.1 Each periodic review includes an examination of program goals, design, curriculum, requirements, student success, technology uses, advising services, assessment procedures and program outcomes for prospective teachers.	O	O	O	O
7.2 Each program review examines the quality and effectiveness of collaborative partnerships with secondary schools and community colleges.	O	O	O	O
7.3 The program uses appropriate methods to collect data to assess the subject matter program's strengths, weaknesses and areas that need improvement. Participants in the review include faculty members, current students, recent graduates, faculty in pedagogical preparation programs that graduates enter, employers of credentialed teacher graduates, and appropriate community college and public school personnel. All these stakeholders will have subsequent opportunities to examine review findings and contribute to program development decisions.	O	O	O	O
7.4 Program improvements are based on the results of periodic reviews, the inclusion and implications of new knowledge about the subject(s) of study, the identified needs of program students and school districts in the region, and curriculum policies of the State of California.	O	O	O	O

Standards Common to All

7.5 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, what would you add?

Standards Common to All

	8.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 8: Literacy	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The program of subject matter preparation for prospective Single-Subject teachers develops skills in literacy and academic discourse in the academic disciplines of study. Coursework and field experiences in the program include reflective and analytic instructional activities that specifically address the use of language, content and discourse to extend meaning and knowledge about ideas and experiences in the fields or discipline of the subject matter.	O	O	O	O
8.1 The program develops prospective teachers' abilities to use academic language, content, and disciplinary thinking in purposeful ways to analyze, synthesize and evaluate experiences and enhance understanding in the discipline.	O	O	O	O
8.2 The program prepares prospective teachers to be subject matter literate and able to use the research conventions of the disciplines of the subject matter.	O	O	O	O
8.3 The program provides prospective teachers with opportunities to learn and demonstrate competence in reading, writing, listening, speaking, communicating and reasoning in their fields or discipline of the subject matter.	O	O	O	O
8.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, what would you add?				

Standards Common to All

	9.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 9: Early Field Experiences	**Essential**	**Important**	**Somewhat Important**	**Not Important**
Prospective Single Subject teachers have planned, structured field experiences in departmentalized classrooms beginning as early as possible in the subject matter program. These classroom experiences should be linked to program coursework and should give a breadth of experiences across grade levels and with diverse populations. The early field experience program should be planned collaboratively by subject matter faculty, teacher education faculty and representatives from school districts. The institution will cooperate with school districts in selecting schools and classrooms for introductory classroom experiences and document each prospective teachers' observations and experiences.	O	O	O	O
9.1 Introductory experiences include one or more of the following activities: planned observations, instruction or tutoring experiences, and other school based observations or activities that are appropriate for undergraduate students in a subject matter preparation program.	O	O	O	O
9.2 Prospective teachers' early field experiences are substantively linked to the content of coursework in the program. Early field experiences encompass a variety of settings, grade levels and student populations.	O	O	O	O
9.3 Early field experiences encompass a variety of settings, grade levels, and student populations.	O	O	O	O
9.4 Prospective teachers have opportunities to reflect on and analyze their early field experiences in relation to course content. This reflection and analysis is documented using instructional methods such as completion of carefully designed field experience journals, portfolios of required field experience components, discussions in the subject matter course.	O	O	O	O

Draft Standard 9: Early Field Experiences	Essential	Important	Somewhat Important	Not Important
9.5 Each prospective teacher is primarily responsible for documenting early field experiences. Documentation is reviewed as part of the subject matter requirements.	O	O	O	O
9.6 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, what would you add?				

Standards Common to All

	10.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 10: Varied Teaching Strategies	**Essential**	**Important**	**Somewhat Important**	**Not Important**
In the program, prospective Single Subject teachers participate in a variety of learning experiences that model effective curriculum practices, instructional strategies and assessments that prospective teachers will be expected to use in their own classrooms. Prospective teachers experience a variety of assessments as an integral part of instruction, reflect on themselves as learners, and examine ways in which subject matter content is conceived and organized for instruction and learning. Faculty development programs enable college and university subject matter faculty to explore and use varied teaching practices.	O	O	O	O
10.1 Prospective teachers experience in their coursework a variety of assessments, including wide use of selected response, constructed response, oral assessment, and performance-based assessment practices.	O	O	O	O
10.2 Program faculty include in their instruction a variety of curriculum design, classroom organizational strategies, activities, materials, and field experiences incorporating observing, recording, analyzing and interpreting content as appropriate to the discipline.	O	O	O	O
10.3 Program faculty employ a variety of interactive engaging teaching styles that develop and reinforce skills and concepts through open-ended activities such as direct instruction, discourse, demonstrations, individual and cooperative learning explorations, peer instruction, and student-centered discussions.	O	O	O	O
10.4 Faculty development programs provide tangible support for subject matter faculty to explore and use exemplary and innovative curriculum practices.	O	O	O	O

Draft Standard 10: Varied Teaching Strategies	Essential	Important	Somewhat Important	Not Important
10.5 Program coursework and fieldwork provide prospective teachers opportunities to reflect on different learning styles and cognitive development theories and their implications for mastery of subject content.	O	O	O	O
10.6 Program faculty use varied and innovative teaching strategies, which provide opportunities for prospective teachers to learn how content is conceived and organized for instruction in a way that fosters conceptual understanding as well as procedural knowledge.	O	O	O	O
10.7 Program coursework and fieldwork include the examination and use of various kinds of technology that are appropriate to the subject matter discipline.				
10.8 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, what would you add?				

Draft Single Subject Program Standards for Science

Standard 11:	The Vision for Science
Standard 12:	General Academic Quality
Standard 13:	Integrated Study of Science
Standard 14:	Breadth of Study in Science
Standard 15:	Depth of Study in a Concentration Area
Standard 15A:	Depth of Study in Biological Sciences
Standard 15B:	Depth of Study in Chemistry
Standard 15C:	Depth of Study in Geosciences (Earth and Planetary Sciences)
Standard 15D:	Depth of Study in Physics
Standard 16:	Laboratory and Field Experience
Standard 17:	Safety Procedures

Single Subject Program Standard for Science

	11.0 How important are these program characteristics for preparing effective teachers of science?			
Draft Standard 11: The Vision for Science	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The institution articulates a philosophical vision of science and the education of prospective science teachers. Each program references the current California Science Framework as part of its vision statement.	O	O	O	O
11.1 The program includes a code of ethics that can be applied to the practice of science.	O	O	O	O
11.2 The program examines ethical, moral, social, and cultural implications of significant issues and ideas in science and technology.	O	O	O	O
11.3 The program explores practical solutions to challenging important and relevant problems.	O	O	O	O
11.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, which would you add?				

Single Subject Program Standards for Science

	12.0 How important are these program elements for preparing effective teachers of science?			
Draft Standard 12: General Academic Quality	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The program is academically rigorous and intellectually stimulating. It provides opportunities for students to experience and practice analyzing complex situations to make informed decisions and to participate in scientific problem solving. In the program, each prospective teacher develops effective written and oral communication skills with a focus on concepts and methodologies that comprise academic discourse in science.	O	O	O	O
12.1 The program requires sufficient practice in written and oral communication skills that enable prospective teachers to express scientific ideas, concepts, and methods accurately.	O	O	O	O
12.2 The program promotes the use of quantitative reasoning and encourages prospective teachers to analyze complex situations, make informed decisions, and participate in scientific problem solving.	O	O	O	O
12.3 The program regularly requires prospective teachers to participate in scientific investigation.	O	O	O	O
12.4 The program allows prospective teachers to gain experience in critically analyzing and reviewing scientific writings and research.	O	O	O	O
12.5 The program provides opportunities for prospective teachers to examine conceptual and physical models and their evolution over time.	O	O	O	O
12.6 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, which would you add?				

Single Subject Program Standards for Science

	13.0 How important are these program elements for preparing effective teachers of science?			
Draft Standard 13: Integrated Study of Science	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The program reflects science as an integrated entity and emphasizes interrelationships among the disciplines of science. Concepts that occur in all science disciplines are examined, and variations in the structures, content, and methods of inquiry in the disciplines are studied. Each prospective single subject teacher gains an understanding of how the conceptual foundations of the scientific disciplines are related to each other.	O	O	O	O
13.1 Each integrative study component develops the prospective single subject teacher's understanding of how the conceptual foundations of the scientific disciplines are related to each other.	O	O	O	O
13.2 Each integrative study component provides opportunities for prospective teachers to examine the interconnections between different fields of science.	O	O	O	O
13.3 The integrative study component(s) of the program require that prospective teachers use higher-level thinking skills while involved in coursework or research practice in each science discipline.	O	O	O	O
13.4 Faculty teaching in the program, and prospective teachers in various disciplines of science meet regularly to exchange ideas and perspectives.	O	O	O	O
13.6 The program includes courses and/or projects that integrate science as a whole.	O	O	O	O
13.7 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, which would you add?				

Single Subject Program Standards for Science

	14.0 How important are these program elements for preparing effective teachers of science?			
Draft Standard 14: Breadth of Study in Science	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The science program is organized to provide prospective teachers a sufficiently broad understanding of science so that, as future literate science teachers, they have the necessary knowledge, skills, and abilities to develop scientific literacy among their students. A breadth of study provides familiarly with the nature of science and major ideas foundational to all the sciences, and provides a basis for prospective teachers to engage in further studies of a scientific discipline. The program is aligned with the *Science Content Standards for California Public Schools, Kindergarten through Grade Twelve.*	O	O	O	O
14.1 The program encompasses the general science specifications for subject matter knowledge and competence contained in Part 1 Content Domains in General Science (1-12) which includes the following general areas of study aligned with the K-12 Student Academic Content Standards.	O	O	O	O
14.2 The program addresses the subject matter skills and abilities applicable to the content domains in science listed below: 17 Astronomy 18 Dynamic Processes of the Earth (Geodynamics) 19 Earth Resources 20 Ecology 21 Genetics/Evolution 22 Molecular Biology and Biochemistry 23 Cell and Organismal Biology 24 Waves 25 Forces and Motion 26 Electricity and Magnetism 27 Heat Transfer and Thermodynamics 28 Structure and Properties of Matter	O	O	O	O

Single Subject Program Standards for Science

14.3 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, which would you add?

Single Subject Program Standards for Science

	15.0 How important are these program elements for preparing effective teachers of science?			
Draft Standard 15: Depth of Study in a Concentration Area	**Essential**	**Important**	**Somewhat Important**	**Not Important**
Each candidate for the Single Subject Credential in Science must complete a subject matter program that includes Concentration ***15A, 15B, 15C, or 15D.*** Concentration in the identified discipline prepares prospective teachers to teach a full range of courses authorized by the single subject credential authorization. Depth within a discipline is essential for teaching advanced and specialized courses.	O	O	O	O

15.1 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, which would you add?

Single Subject Program Standards for Science

	15A.0 How important are these program elements for preparing effective teachers of science?			
Concentration 15A: Depth of Study in Biological Sciences	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The Concentration in Biological Sciences includes a depth of study of biology is significantly greater than that required for a general understanding of science as described in Standard 14. The depth of study in Concentration 15A should provide conceptual foundations distributed across the discipline. Integral to the concentration are conceptual foundations that include cell biology and physiology, genetics, evolution, and ecology. Concentration 6A includes in-depth study and field/laboratory experiences in biology; achievement of an appropriate level of understanding in chemistry, mathematics and physics; use of methods employed by scientists in the generation knowledge; and application of biological sciences to technological and societal issues including ethical considerations. Candidates for the Science Credential with a Concentration in Biological Sciences with be able to teach a wide variety of biology courses in their teaching assignments. The program is aligned with the *Science Content Standards for California Public Schools. Kindergarten through Grade Twelve.* The concentration in Biological Sciences will prepare prospective teachers to teach the full range of biology courses authorized by this credential.	O	O	O	O
15A.1 Encompass the biological science requirements for subject matter knowledge and competence on contained in Part 1 Content Domains for Biology and Life Sciences that are aligned with the K-12 Student Academic Content Standards.	O	O	O	O
15A.2 Encompass the subject matter skills and abilities applicable to the content domains in science as stated in the SMR Part II Section on pages xx and xx.	O	O	O	O

Single Subject Program Standards for Science

15A.3 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, which would you add?

Single Subject Program Standards for Science

	15B.0 How important are these program elements for preparing effective teachers of science?			
Concentration 15B: Depth of Study in Chemistry	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The Concentration in Chemistry includes a depth of study within chemistry significantly greater than that required for a general understanding of science as described in Standard 5. The depth of study should provide conceptual foundations distributed across the discipline. Integral to the concentration are conceptual foundations that include atomic and molecular structure, chemical reactions, kinetic molecular theory, solution chemistry, chemical thermodynamics, organic chemistry and biochemistry, and nuclear processes. Concentration 15B includes in-depth study and field/laboratory experiences in chemistry, achievement of an appropriate level of understanding in mathematics and physics, use of methods employed by scientists in the generation of scientific knowledge, and application of chemistry to technological and societal issues including ethical considerations. Candidates for the Science Credential with a Concentration in Chemistry will be able to teach a wide variety of chemistry courses in their teaching assignments. The program is aligned with the *Science Content Standards for California Public Schools, Kindergarten through Grade Twelve.*	O	O	O	O
15B.1 Encompasses the subject matter skills and abilities applicable to the content domains in science contained in the SMR Part I Chemistry Domains 1-7..	O	O	O	O
15B.2 Include demonstration of mathematical skills and other scientific knowledge needed to complete studies that are required by advanced courses in chemistry.	O	O	O	O
15B.3 Encompass the chemistry specifications for subject matter knowledge and competence contained in tbe SMR Part II Chemistry Domains 1,2, and 3 that are aligned with the K-12 Student Academic Content Standards.	O	O	O	O

Single Subject Program Standards for Science

15B.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, which would you add?

Single Subject Program Standards for Science

	15C.0 How important are these program elements for preparing effective teachers of science?			
Concentration 15C: Depth of Study in Geosciences (Earth and Planetary Sciences)	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The Concentration in Geosciences (Earth and Planetary Science) includes a depth of study of earth and planetary science significantly greater than that required for a general understanding of science as described in Standard 14. The depth of study in Concentration 15C should provide conceptual foundations in the earth and planetary sciences, and should provide conceptual foundations that include Earth's place in the universe, planet Earth, energy in the earth system, biochemical cycles, and California geology. Concentration 15C includes in-depth study and field/laboratory experiences in earth and planetary science, achievement of an appropriate level of understanding in mathematics, use of methods employed by scientists in the generation of scientific knowledge, and application of earth and planetary science to technological and societal issues including ethical consideration. Candidates for the Science Credential with a Concentration in Geosciences will be able to teach in a variety of courses in their teaching assignments. The program is aligned with the *Science Content Standards for California Public Schools, Kindergarten through Grade Twelve.*	O	O	O	O
15C.1 Encompass the earth and planetary science specifications for subject matter knowledge and competence contained in the SMR Part I Domains 1-5 that are aligned with the K-12 Student Academic Content Standards.	O	O	O	O
15C.2 Encompasses the subject matter skills and abilities applicable to the Content domains in service as stated in the SMR Part II section contained in the SMR Part II Domains 1, 2 anf 3.	O	O	O	O
15C.3 Include demonstration of mathematical skills needed to complete studies that are required by advanced courses in the earth and planetary sciences.	O	O	O	O

Single Subject Program Standards for Science

15C.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, which would you add?

Single Subject Program Standards for Science

	15D.0 How important are these program elements for preparing effective teachers of science?			
Concentration 15D: Depth of Study in Physics	**Essential**	**Important**	**Somewhat Important**	**Not Important**
The Concentration in Physics includes a depth of study of physics significantly greater than that required for a general understanding of science as described in Standard 14. The depth of study in Concentration 15D should provide conceptual foundations in physics, and should provide conceptual foundations distributed across the discipline of physics. Integral to the concentration are conceptual foundations that include motion and forces, conservation of energy and momentum, heat and thermodynamics, waves, electromagnetism, and quantum mechanics and the standard model of particles. Concentration 15D includes in-depth study and laboratory experiences in physics, achievement of an appropriate level of understanding in mathematics, use of methods employed by scientists in the generation of scientific knowledge. Candidates for the Science Credential with a Concentration on Physics will be able to teach a variety of physics courses in their teaching assignments. The program is aligned with the *Science Content Standards for California Public Schools, Kindergarten through Grade Twelve.*	O	O	O	O
15D.1 Encompass the physics specifications for subject matter knowledge and competence contained in the SMR Part I Physics Domains 1-5 that are aligned with the K-12 Student Academic Content Standards.	O	O	O	O
15D.2 Encompasses the subject matter skills and abilities applicable to the Content domains in service in the SMR Part II Domains 1, 2 and 3.	O	O	O	O
15D.3 Include demonstration of mathematical skills needed to complete studies that are required by advanced courses in physics.	O	O	O	O

Single Subject Program Standards for Science

15D.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)*

O Yes O No

If YES, which would you add?

Single Subject Program Standards for Science

	16.0 How important are these program elements for preparing effective teachers of science?			
Draft Standard 16: Laboratory and Field Experiences	**Essential**	**Important**	**Somewhat Important**	**Not Important**
Laboratory and field experiences constitute a significant portion of coursework in a program that includes open-ended, problem solving experiences. Prospective teachers have the opportunity to design a variety of laboratory experiments. Data is collected, analyzed, and processed using statistical analysis and current technology (where appropriate).	O	O	O	O
16.1 The program includes required laboratory components in no less than one-third of its courses.	O	O	O	O
16.2 The program includes periodic open-ended, problem-solving experiences in its coursework.	O	O	O	O
16.3 The program requires prospective teachers to organize, interpret, and communicate observation data collected during laboratory or field experiences using statistical analysis when appropriate.	O	O	O	O
16.4 The program requires prospective teachers to design and evaluate laboratory experiments and/or fieldwork.	O	O	O	O
16.5 The program involves prospective teachers in research and collection of data that requires utilization of current technology.	O	O	O	O
16.6 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, which would you add?				

Single Subject Program Standards for Science

	17.0 How important are these program elements for preparing effective teachers of science?			
Draft Standard 17: Safety Procedures	**Essential**	**Important**	**Somewhat Important**	**Not Important amt**
The program instructs prospective teachers in proper safety procedures prior to laboratory and field experiences. This includes instruction in emergency procedures and proper storage, handling and disposal of chemicals and equipment. The program provides facilities equipped with necessary safety devices and appropriate storage areas. When the program provides experiences with live organisms, they are observed, captured, and cared for both ethically and lawfully.	O	O	O	O
17.1 The program instructs prospective teachers in proper safety procedures (safe uses of chemicals, specimens, and specialty equipment) prior to laboratory and field experiences, and implements current safety guidelines and regulations.	O	O	O	O
17.2The program provides facilities that are equipped with appropriate safety devices.	O	O	O	O
17.3 The program provides instruction in, and demonstrates emergency procedures and proper storage, handling, and disposal of chemicals, specimen, and equipment.	O	O	O	O
17.4 Are there any critical characteristics of program quality missing from the above standard that are important in a program that will prepare effective science teachers? *(Please fill in Yes or No)* O Yes O No If YES, which would you add?				

Overall Program Standards

Please judge the extent to which the full set of subject matter program standards described in this survey encompass the program elements that are necessary to prepare an effective social science teacher by answering the questions below.

If you think the full set of program standards cover all of the critical program elements that are necessary to prepare effective social science teachers, write 100 in the space provided in Question a. If you think the program standards cover **none** of the program elements that are necessary to prepare an effective science teacher, write 0 in the space provided. If you think the program standards cover **some, but not all,** of the program elements, write a number from 1 to 99 to reflect the proportion of the single subject program in science that *are covered* by these program standards.

a. Taken **as a whole**, what percentage of the program elements needed to prepare effective **science** teachers is covered by **the full set** of program standards?	**b.** If less than 100% in Question a, please identify any critical program elements that are missing from the program standards. *(It is not necessary to repeat missing elements you mentioned in previous responses.)*
__ __ __ %	